

ANIMAL

**PROTECTION** 

**INSTITUTE** 

API Headquarters
Mailing Address:
P.O. Box 22505
Sacramento, CA
95822

Street Address: 1122 S Street Sacramento, CA 95814

916.447-3085 1.800.348.7387 Fax 916.447-3070 info@api4animals.org www.api4animals.org



August 31, 2005

Upper Mississippi River National Wildlife and Fish Refuge 51 E. Forth Street – Room 101 Winona, Minnesota 55987

Sent via U.S. Mail and electronically at <a href="http://www.fws.gov/midwest/planning/uppermiss/index.html">http://www.fws.gov/midwest/planning/uppermiss/index.html</a>

**RE:** Draft CCP and EIS for Upper Mississippi River National Wildlife and Fish Refuge

To Whom It May Concern:

On behalf of the Animal Protection Institute (API) and our 85,000 national members and supporters, 8,426 of whom reside in Minnesota, Iowa, Wisconsin, and Illinois, we are pleased to offer these comments on the Draft Environmental Impact Statement (Draft EIS) and Draft Comprehensive Conservation Plan (Draft CCP) for the Upper Mississippi River National Wildlife and Fish Refuge.

Our organization is very concerned that in managing National Wildlife Refuges (NWRs), the U.S. Fish and Wildlife Service (FWS) has strayed far from its own policy, which "directs that wildlife comes first in the National Wildlife Refuge System" (602 FW § 1.4A; emphasis added). Many refuges allow, and even encourage, activities detrimental to wildlife, including hunting, fishing, trapping, motor boating, and jet skiing. In many instances, these recreational uses are permitted in the absence of thorough and accurate impact assessments and biological data on the species inhabiting and migrating through the refuge.

While the National Wildlife Refuge System Improvement Act of 1997 16 U.S.C. § 668dd, et seq. (hereafter "the Act") establishes hunting as a priority use, the Act also requires refuges to conduct rigorous scientific research into the status of refuge wildlife populations and use this information to guide refuge planning. Moreover, wildlife trapping is not included as a "priority use" in the Act and therefore does not carry the same weigh in regard to activities that refuge managers are expected to favor and expand in the management planning process.

It is our hope that the Upper Mississippi River National Wildlife and Fish Refuge management team will help to restore this public land system to its original purpose of providing a "refuge and breeding place" for "migratory birds, other wild birds, game animals, fur-bearing animals, and for the conservation of wild flowers and aquatic plants." (Per Public Law 268).

#### Requirements of the National Wildlife Refuge System Improvement Act of 1997

The discussion of potential impacts and benefits of the various alternatives in the Draft CCP and EIS appears to be largely based on conjecture rather than rigorous scientific study specific to wildlife populations and dynamics of the Upper Mississippi River National Wildlife and Fish Refuge.

The Act requires that the FWS "ensure the biological integrity, diversity and environmental health of the [Refuge] System are maintained" (Section 7(e)(2)(B), National Wildlife Refuge System Improvement Act) and that refuge planning be firmly grounded in these concepts. A thorough discussion and investigation of the biological integrity, diversity, and environmental health of a refuge must therefore occur before planning can ensue.

In developing each comprehensive conservation plan under this subsection for a planning unit, the Secretary, acting through the Director, shall identify and describe ... the distribution, migration patterns, and abundance of fish, wildlife, and plant populations and related habitats within the planning unit – Section 7(e)(2)(B), National Wildlife Refuge System Improvement Act

Furthermore, FWS regulations require that before the sanctioning of hunting, trapping, or fishing can occur, a determination must be made that "wildlife are surplus to a balanced conservation program on any wildlife refuge area" (50 C.F.R. §31.2 et seq.). To determine if there is a surplus of wildlife on a refuge, the "populations and requirements of wildlife species ... shall be determined by population census, habitat evaluation, and other means of ecological study" (Id. at §31.1).

The mere presence of a species on a refuge is not evidence of a surplus; rather, a surplus determination has to consider both the population size and requirements of the target species. If no surplus is determined, then, unless the species is damaging or destroying federal property within a refuge, the species cannot be subject to live removal or lethal control, including through official animal control operations.

Therefore, to attempt to determine compatible wildlife-dependent recreation for the Upper Mississippi River National Wildlife and Fish Refuge until this process has been completed may violate these mandates. This is especially true for the consideration of hunting and trapping since both activities result in the direct and intentional removal of species and can negatively impact populations, particularly when such activities are geographically focused in a particular region and/or on a particular species.

## The Current Trapping Program Should Be Suspended

According to the 1997 U.S. Fish and Wildlife Service National Wildlife Refuge Trapping Survey, the Upper Mississippi River National Wildlife and Fish Refuge has 3 trapping programs for which the primary purpose is recreational/commerce/subsistence and predator control for migratory bird protection. Target species include muskrat, beaver, raccoon, opossum, striped skunk, weasels, river otter, mink, red fox, coyote, and unspecified "other." According to the survey, the types of traps used on the refuges include live enclosure, steel-jaw leghold and Conibear-type kill traps.

However, the FWS is currently relying on an outdated "Refuge Fur Management Plan" that was produced in 1988 as the base impact assessment document for its trapping programs. While the agency acknowledges that this document must be revised, it also states that it is separating revision of this management plan from the normal CCP/EIS process and delaying revision and public comment until 2007 with no adequate justification for the delay/process separation.

As such the Draft EIS/CCP fail to describe the impacts the current (and future) trapping program have on the environment and on target and non-target wildlife. Consequently, the Draft EIS/CCP do not allow for the adequate evaluation and consideration of the Refuge's trapping programs within the proposed alternatives. It is therefore premature for the FWS to issue a Final CCP and EIS prior to a thorough assessment of the Refuge's trapping programs.

API contends the FWS cannot separate the impact assessment of its trapping programs from the CCP/EIS process, while continuing to allow trapping under its antiquated "Refuge Fur Management Plan." The FWS must either fully analyze its trapping programs in a revised Draft EIS/CCP and re-circulate an amended version for public comment or suspend the current trapping programs until these programs are fully analyzed, publicly reviewed, and brought into compliance with Refuge policies, regulations, and statutes.

While the Draft Compatibility Determination states that, "The Refuge's Fur Management Plan" concludes that the trapping program "does not have any appreciable negative impacts on furbearer populations," this determination was 17 years ago. In the 17 year interim, wild furbearer populations have changed, sometimes significantly, pelt prices have fluctuated, and trapper harvest has dramatically varied Moreover, the Plan relies heavily on state wildlife agency wildlife population data that have not been independently and rigorously evaluated by the FWS.

For example, the Draft Compatibility Determination notes that, "there has been a recent decline in beaver populations along the Mississippi River management zone, but no change in beaver trapping regulation have been made by the State," and, "Minnesota also reports that the red fox population has shown a slight decline in the western and southern portions of the state between 1992 and 2000." Despite these findings, trapping of these species continues to be allowed on the Refuge under the current plan.

In addition, within the Draft Compatibility Determination, the FWS admits that trapping may directly impact migratory birds during pair bonding/nesting season, or by the trampling of nests and that the catch of target and non-target species that a prey on migratory birds or induce habitat changes may cause indirect impacts. However, it later claims that such impacts by trappers are "negligible," but offers no explanation for how this was determined.

The Draft Compatibility Determination briefly mentions the benefits to migratory birds and fish by the habitat altering behavior of heavily trapped species such as muskrat and beaver, but fails to evaluate the impact of trapping on these beneficial activities or how trapping, which in general fails to follow the laws of natural selection by removing the healthiest animals, affects the genetic health and vigor of populations in the long-term.

### **Body-Gripping Traps Pose Serious Hazard to Non-Target Wildlife**

There is wide spread agreement among veterinarians, veterinary associations, biologists and the general public that the primary traps used today—legholds, Conibears and snares—are both inhumane and indiscriminate.

In addition, leghold traps and Conibear traps pose a serious hazard to non-target wildlife, including threatened and endangered species (T&E species). Records obtained from state and federal wildlife agencies by API show that bald eagles, lynx, wolves, and other species listed under the Endangered Species Act have been injured and killed in leghold and Conibear traps. Recently, when animal advocates provided documentation that three Bald Eagles and numerous Canada Lynx had been incidentally killed in traps set for coyotes in the state of Maine, the Maine Attorney General ruled that the state Inland Wildlife & Fisheries agency had to end its coyote trapping program until the state obtained an Incidental Take Permit (ITP) under the Endangered Species Act from the FWS. We contend this is just the beginning of a much larger issue regarding the significant hazards traps pose to threatened and endangered species and that both state and federal wildlife management agencies are required by law to mitigate harm and seek ITPs if there is potential harm/take of T&E species from the use of traps. The Draft CCP and EIS for the Upper Mississippi River National Wildlife and Fish Refuge, however, fail to

address this issue. We therefore contend that the FWS must reissue a revised DCCP and EIS that thoroughly analyses this issue and opens this document up to public comment prior to the issuance of a final CCP and EIS.

Any assessment of trapping on refuges must include a thorough literature review of trap studies and of the potential impacts traps may have on non-target wildlife. At a minimum, the following considerations should be incorporated into the Refuge trapping program assessment:

## A. Leghold traps

The Animal Welfare Institute sent a questionnaire to veterinarians in Illinois, Michigan, New York, Texas, North Dakota, Washington, and Louisiana. Veterinarians were asked if they supported or opposed the use of this trap. An overwhelming percentage, 79.3 percent of the 936 veterinarians responding, opposed steel-jawed leg-hold traps. The Animal Welfare Institute survey also requested information relative to injuries to pets and wild animals. More than 4,000 injuries or deaths of domestic or non-target animal were reported from the 936 veterinarians in seven states (CDFG pg. 95-96).

Atkeson (1956) reported that >24% of minks, raccoons and foxes were crippled while escaping from leghold traps set in on a National Wildlife Refuge in Alabama over a four year period. In contrast, opossums and skunks were crippled in only 2% of captures. For the purposes of this study, "all animals were considered crippled that pulled out of traps, escaped by wringing off or gnawing off feet, or escaped with traps." During a study of population dynamics in Canada, MacPherson (1969) found most trapped arctic foxes he observed had ingested pieces of their own hair, bone and skin. The struggle can also lead to a variety of bone fractures, including simple, compound and compression fractures. Olsen et al. (1986) observed a 91% leg fracture rate for coyotes caught in unpadded traps, while 3 of 4 captured kit foxes caught had nearly or completely amputated their trapped leg. Damage to teeth and gums can occur when a captured animal attacks the trap with its mouth in an attempt to escape (MacPherson 1969; England 1982; Van Ballenberghe 1984; Keuhn et al. 1986; Kern et al. 1994; Hubert et al. 1997), though this type of injury is generally ignored by most trapping studies (Onderka et al. 1990). Englund (1982) found severe dental injuries in 58% of adult foxes captured in leghold traps while Van Ballenberghe (1984) reported that injuries to teeth, lips and gums occurred in 46% of 109 wolves captured. Other studies corroborate these findings (Berchielli and Tullar 1980; Novak 1981; Englund 1982; Van Ballenberghe 1984; Tullar 1984; Kuehn et al. 1986; Linhart et al. 1988; Olsen et al. 1988; Onderka et al. 1990; Phillips et al. 1992; Kern et al. 1994; Mowat et al. 1994; Proulx et al. 1994; Phillips et al. 1996; Hubert et al. 1997).

Despite the preponderance of evidence showing that leghold traps cause severe injuries to captured animals, most studies have actually underestimated the extent of injuries caused by these devices. With very few exceptions (Onderka et al. 1990; Huber et al. 1997) injury studies have limited their analysis of injuries to the trapped limb (Tullar 1984; Olsen et al. 1986, 1988; Houben et al. 1993; Gruver et al. 1996; Phillips et al. 1996) or the leg plus the head (Van Ballenberghe 1984; Kern et al. 1994) and thus have not considered injuries to other areas of the body. The importance of examining the whole body was stressed by Hubert et al. (1997), who found leg injury scores of coyotes were approximately 15% lower than whole body scores. Without an analysis of the entire body, critical injures may be missed and therefore the true extent of injury not determined.

Aside from the injuries they cause, leghold traps are notorious for no being species-specific. Beasom (1974), Berchielli and Tullar (1980), and Novak (1981) found nontarget animals comprised 56%, 32% and 76% of leghold captures, respectively and Beasom (1974) noted that "more individuals and species of animals were caught with steel traps in this study than with any other control methods used."

## B. "Padded" Leghold traps

While padded leghold traps are ostensibly more humane than unpadded traps, studies confirm that even padded traps can cause significant damage to trapped animals.

"In a letter to the Department dated August 13, 1990, Dr. N. C. Buyukmihci, DVM, Associate Professor of Surgery, University of California, Davis, writes: 'Several Studies have been done comparing the effects of padded verses unpadded traps on various animals. These have shown that both could and did cause the same degree of damage to a limb, including laceration of skin and fracture of bones'" (CDFG pg. 98).

"Padded leghold traps show injury reduction for some species, but not for others. They have failed to consistently reduce injuries to raccoons. (Bishop 1990)...The No. 1 ½ size padded traps cause fewer injuries to foxes than standard traps, but there was no difference of bobcats. Considering research findings to date, Soft Catch traps achieve injury reduction for some species, but not for others (Bishop 1990, from CDFG)."

While padded leghold traps have been shown to reduce the occurrence and severity of injuries in a number target species by 48-85% (Saunders and Roswell 1984; Olsen et al. 1986; Onderka et al. 1990), injuries have not been eliminated and injuries to smaller nontarget species may be especially severe. Even if captured animals are alive when released, any injury or disfigurement will invariably reduce an animal's ability to survive. Van Ballenberghe (1984) noted that "Reduced fitness and shortened life span ultimately resulting from capture caused injuries may be as important to consider as proximate mortality."

New devices have the potential to reduce the incidence of non-target captures. Pan tension devices (PTD) have been shown to exclude up to 98% of nontarget animals in studies (Turkowski et al. 1984; Phillips and Gruverd 1996). However, since PTDs also reduce target capture rates it is unlikely that they will be widely used by commercial and recreational trappers. If the refuges insist that leghold traps are needed for research then padded traps equipped with pan tension devices should be required.

#### C. Conibear Traps

As a trap designed to kill animals instantly, the Conibear poses a serious hazard to T&E species and other non-target wildlife. While studies suggest that the ability of kill-type traps to produce rapid death have been greatly improved, for a number of species (Proulx et al. 1989; Barrett et al. 1989; Proulx et al. 1990; Proulx and Barrett 1993; Proulx et al. 1995) there have been no significant advances in reducing nontarget captures. Research has shown that for every target animal captured at least 2 other nontarget animals are caught (Novak 1987; Barret et al. 1989; Proulx and Barrett 1993).

The California Department of Fish and Game reported that, "Several factors keep this trap from killing consistently and quickly, including the size of the animal, the species involved, the position of the animal at trap closure, and the impact and clamping levels of the trap. The most significant flaw is the trigger system that performs erratically, preventing a fatal blow to the animals body (CDFG pg. 94)."

# Alternatives to Trapping for Migratory Bird and Facilities Protection

According to the Executive Summary, under the current management, waterfowl and other migratory birds will "continue their long-term trend downward in terms of species diversity, use of the Refuge, or overall population." It is puzzling that despite this "long-term trend downward," recreational waterfowl hunting has continued to be allowed on the refuge. In addition, this downward trend has apparently

continued despite trapping programs ostensibly conducted for the benefit of migratory birds (highlighting the inefficacy of trapping programs in augmenting migratory waterfowl populations, a point which the Draft CCP and EIS fail to analyze). While we can find no reasonable explanation for the first conundrum, reasons for the second have been explored in scientific literature.

Research indicates that killing predators to protect ground-nesting birds does not reliably increase breeding populations of ground-nesting birds; where such increases have been documented, they tend to be temporary at best (Cote and Sutherland 1997). Lethal predator control raises ethical questions and may be no more effective, especially over the long-term, than innovative non-lethal solutions (Goodrich and Buskirk1995).

It is well known that killing wildlife as a means to resolve human/wildlife conflicts is ineffective in the long run, an important argument that neither the Draft CCP, nor the EIS adequately address. When animals are killed, they leave behind a habitat vacancy that new animals eventually fill — particularly if the attracting features or resources have not been eliminated. There are many humane, non lethal wildlife management tools available to resource and refuge managers to alleviate conflicts. For example, with regard to beaver conflicts, the construction of water-level control devices could be used to prevent flooding and could serve as a humane substitute for trapping and killing beavers. Such devices have been successfully implemented by municipalities and state wildlife agencies in a number of states, including Maine and Connecticut, and should be used more frequently by federal wildlife management agencies.

With this in mind, we request that the FWS provide the following information in a revised Draft CCP and EIS:

- Current and historic (last 20 years) population status of species targeted in refuge trapping programs.
- Number of target and non-target animals trapped each year under the current trapping program(s) and projected data on number of animals trapped under any proposed action.
- Impacts of species-specific "overpopulations" on ecosystem and / or other species.
- Description, and degree, of damage to facilities/habitat as a result of perceived "overpopulations" of targeted species, if any, and effects of trapping in past years on perceived damage and on targeted species populations.

We also ask that the FWS discuss and evaluate the following:

- Alternative, non-lethal methods of habitat protection/facilities management.
- What efforts have been taken to reduce trap-related injuries to captured animals?
- What are the real and potential impacts to non-target species, including threatened and endangered species?
- What threatened and endangered species have been incidentally trapped on the refuges that currently allow trapping?
- What efforts are taken to ensure that non-target species will not be injured or killed by the current or proposed trapping programs?
- Feasibility of implementing non-lethal water-level control devices for controlling beaver damage (including, but not limited to, Beaver Deceiver devices, Clemson Levelers, Beaver Bafflers, diversion dams, pipe systems).
- Feasibility of implementing other non-lethal beaver control methods including, but not limited to, different types of fencing (including wire mesh and electrical systems), tree wrapping, and textural and taste repellents.
- Complete assessment of the economic, environmental, and social benefits beaver, muskrat and other trapped species provide to habitat and wildlife enhancement and for wildlife watching activities.

## Public opposition to trapping

The Draft CCP and EIS fail to fully assess public attitudes toward various activities allowed on the Upper Mississippi River National Wildlife and Fish Refuge.

The majority of people who visit refuges do so to observe wildlife and enjoy nature. According to the FWS 1995 survey of 27.1 million refuge visitors, 81.5 percent went for environmental education purposes, to view and photograph wildlife and for similar non-consumptive reasons, while only 4.5 percent went there to hunt or trap. Most Americans view wildlife refuges as sanctuaries, places where wild animals are protected from human exploitation. A 1999 national Decision Research public opinion poll showed that a vast majority of American oppose trapping on National Wildlife Refuges and would like to see this public land system managed for the benefit and protection of wildlife:

- 79% of those polled opposed allowing trapping on America's National Wildlife Refuges.
- 88% of those polled support either a ban on all commercial and recreational trapping for fur or a ban on cruel types of traps, such as leghold or body-gripping traps.
- 88% agreed that wildlife and habitat preservation should be the highest priority of the refuge system.
- 83% disagreed that the rights of hunters and trappers are more important than the need to protect wildlife on refuges.
- 78% opposed allowing refuge officials to kill wildlife by trapping, hunting or poisoning.
- 78% oppose tax dollars being spent to allow commercial fur trapping of wildlife on refuges
- 71% agreed that as long as refuge officials can remove dangerous animals, there is no reason to allow any other killing of animals on refuge property

We ask that national polling data that specifically address public attitudes about recreational activities on refuges be incorporated and cited within a revised Draft CCP and EIS.

#### Conclusion

We appreciate the opportunity to comment on this issue, which is of great importance to our members and supporters nationwide. To reiterate, API contends the FWS cannot separate the impact assessment of its trapping programs from the CCP/EIS process, while continuing to allow trapping under its antiquated "Refuge Fur Management Plan." The FWS must either fully analyze its trapping programs in a revised Draft EIS/CCP and re-circulate an amended version for public comment or suspend the current trapping programs until these programs are fully analyzed, publicly reviewed, and brought into compliance with Refuge policies, regulations, and statutes.

We thank you for your consideration of these comments and look forward to reviewing a revised Draft CCP and EIS when these documents become available and request to be informed of their availability for further comment.

Sincerely.

Monica Engebretson

Senior Program Coordinator

Camilla H

Director of Wildlife A



#### LITERATURE CITED

- Atkeson, T. Z. 1956. Incidence of crippling loss in steel trapping. Journal of Wildlife Management 20:323-324.
- Baker, J. A. and P. M. Dwyer. 1987. Techniques for commercially harvesting furbearers. Pages 970-995 in M. Novak, J. A. Baker, M. E. Obbard, and B.
- Malloch, editors. Wild furbearer management and conservation in North America. Ontario Trappers Association, North Bay, Ontario, Canada.
- Balser, D. S. 1965. Tranquilizer tabs for capturing wild carnivores. Journal of Wildlife Management 29:438-442.
- Barrett, M. W., G. Proulx, and N. Jotham. 1988. Wild fur industry under challenge The Canadian response. North American Wildlife and Natural Resources Conferences 53:180-190.
- Barrett, M. W., G. Proulx, D. Hobson, D. Nelson, and J.W. Nolan. 1989. Field evaluation of the C120 Magnum trap for marten. Wildlife Society Bulletin 17:299-306.
- Beasom, S. L. 1974. Selectivity of predator control techniques in south Texas. Journal of Wildlife Management 38:837-844.
- Berchielli, L. T. and B. F. Tullar. 1980. Comparison of a leg snare with a standard leg-gripping trap. NY Fish and Game Journal 27:63-71.
- Bortolotti, G. R. 1984. Trap and poison mortality of golden and bald eagles. Journal of Wildlife Management 48:1173-1179.
- Buech, R. R. 1983. Modification of the bailey live trap for beaver. Wildlife Society Bulletin 11:66-68.
- Canadian General Standards Board. 1984. Animal traps, humane mechanically-powered, trigger activated. Re. No. CAN2-144.1-M84. Ottawa, Ontario.
- Cook, S. R., and G. Proulx. 1989. Mechanical evaluation and performance improvement of the rotating jaw Conibear 120 trap. Journal of Testing and Evaluation 17:190-195.
- Cote, I.M. and Sutherland, W.J. 1997. The effectiveness of removing predators to protect bird populations. *Conservation Biology*, 11(2): 395 405.
- Copeland, J. P., E. Cesar, J. M. Peek, C. E. Harris, C.D. Long, and D.L. Hunter. 1995. A live trap for wolverine and other forest carnivores. Wildlife Society Bulletin 23:535-538.
- Dwyer, P. M. 1984. Humane trap field testing during 1981-83. Alberta Energy and Natural Resources Progress Report, Edmonton, Alberta, Canada, 100 pp.
- Englund, J. 1982. A comparison of injuries to leg-hold trapped and foot-snared red foxes. Journal of Wildlife Management 46:1113-1117
- Gerrard, J. M. and G. R. Bortolotti. 1988. The Bald Eagle: haunts and habits of a wilderness monarch. Smithsonian Institute Press.
- Gerstall, R. 1985. The steel trap in North America. Stackpole Books, Harrisburg, PA.
- Goodrich, J.M. and Buskirk, S.W. 1995. Control of abundant native vertebrates for

conservation of endangered species. Conservation Biology, 9(6): 1357 – 1364.

Gilbert, F. F. 1980. Bionic trap-kill tests (mink). University of Guelph report submitted to the Federal Provincial Committee for Humane Trapping,

Guelph, Ontario, Canada, 4 pp.

- Gilbert, F. F. 1981. Maximizing the humane potential of traps the Vital and the Conibear 120. Pages 1,630 -1,646 in J. A. Chapman and D. Pursley (eds.) Proceedings of the Worldwide Furbearer Conference, University of Maryland, Frostburg.
- Gilbert, F. F. and N. Gofton. 1982. Terminal dives in mink, muskrat and beaver. Physiology & Behavior 28:835-840.
- Gruver, K. S., R. L. Phillips, R. L. and E. S. Williams. 1996. Leg injuries to coyotes captured in standard and modified Soft Catch® traps. Proceedings of the Vertebrate Pest Conference 17:91-93.
- Guthery, F. S. and S. L. Beasom. 1978. Effectiveness and selectivity of neck snares in predator control. Journal of Wildlife Management 42:457-459.
  Houben, J. M., M. Holland, S. W. Jack, and C.R. Boyle. 1993. An evaluation of laminated offset jawed traps for reducing injuries to coyotes.
  Proceedings of the Great Plains Wildlife Damage Control Conference 11:148-153.
- Hubert, G. F. Jr., L. L. Hungerford, G. Proulx, R. D. Bluett, and L. Bowman. 1996. Evaluation of two restraining traps to capture raccoons. Wildlife Society Bulletin 24:699-708.
- Hubert, G. F., L. L. Hungerford, and R. D. Bluett. 1997. Injuries to coyotes captured in modified foothold traps. Wildlife Society Bulletin 25:858-863.
- Hubert, G. F., Jr., G. K. Wollenberg, L. L. Hungerford, and R. D. Bluett. 1999. Evaluation of injuries to Virginia opossums captured in the EGG trap\*. Wildlife Society Bulletin 27:301-305.
- International Association of Fish and Wildlife Agencies Fur Resources
  Subcommittee. 1993. Ownership and use of traps by trappers in the United
  States in 1992. Fur Resources Committee of the International Association of
  Fish and Wildlife Agencies and The Gallup Organization, Washington, D.C.
- International Organization for Standardization. TC191. 1999. Animal (mammal) traps Part 5: Methods for testing restraining traps. International Standard ISO/DIS 10990-5. International Organization for Standardization, Geneva, Switzerland.
- Kern, J. W., L. L. McDonald, D. D. Strickland, and E. Williams. 1994. Field evaluation and comparison of four foothold traps for terrestrial furbearers in Wyoming. Western EcoSystems Technology, Cheyenne, Wyoming.
- Krause, T. 1989. National Trappers Association trapping handbook. Spearman Publishing and Printing, Sutton, Nebraska, 206pp.
- Kreeger, T. J., P. J. White, U. S. Seal, and J. R. Tester. 1990.

  Pathological responses of red foxes to foothold traps. Journal of Wildlife Management 54:147-160.
- Kuehn. D. W., T. K. Fuller, L. D. Mech, J. P. William, S. H. Fritts, and W.
  E. Berg. 1986. Trap-related injuries to gray wolves in Minnesota. Journal of Wildlife Management 50:90-91.
- Linhart, S. B., F. S. Blom, G. J. Dasch, and R. M. Engeman. 1988. Field evaluation of padded jaw coyote traps: effectiveness and foot injury. Proceedings of the Vertebrate Pest Conference 13:226-229.

2497

- Linhart, S. B. and G. J. Dasch. 1992. Improved performance of padded jaw traps for capturing coyotes. Wildlife Society Bulletin 20:63-66.
- Linhart, S. B., G. J. Dasch, and F. J. Turkowski. 1981. The steel leghold trap: techniques for reducing foot injury and increasing selectivity. Proceedings of the Worldwide Furbearer Conference 3:1560-1578.
- Linhart, S. B., G. J. Dasch, C. B. Male, and R. M. Engeman. 1986.

  Efficiency of unpadded and padded steel foothold traps for capturing coyotes. Wildlife Society Bulletin 14:212-218.
- Linscombe, G. 1976. An evaluation of the No. 2 Victor and 220 Conibear traps in coastal Louisiana. Proceedings of the Annual Conference of the Southeastern Association of Fish & Wildlife Agencies 30:560-568.
- Linscombe, R. G. and V. L. Wright. 1988. Efficiency of padded foothold traps for capturing territorial furbearers. Wildlife Society Bulletin 16:307-309.
- Macpherson, A. H. 1969. The dynamics of Canadian arctic fox populations. Canadian Wildlife Service Report Series 8. 8pp.
- Mowat, G., B. G. Slough, and R. Rivard. 1994. A comparison of three live capturing devices for lynx: capture efficiency and injuries. Wildlife Society Bulletin 22:644-650.
- Novak, M. 1981. The foot-snare and the leg-hold traps: a comparison. Proceeding of the Worldwide Furbearer Conference 3:1671-1685.
- Novak, M. 1987. Traps and trap research. Pages 941-969 in M. Novak, J. A. Baker, M. E. Obbard, and B. Malloch, editors. Wild furbearer management and conservation in North America. Ontario Trappers Association, North Bay, Ontario, Canada.
- Naylor, B. J. and M. Novak. 1994. Catch efficiency and selectivity of various traps and sets used for capturing American martens. Wildlife Society Bulletin 22:489-496.
- Olsen, G. H., S. B. Linhart, R. A. Holmes, G. J. Dasch, and C. B. Male. 1986. Injuries to coyotes caught in padded and unpadded steel foothold traps. Wildlife Society Bulletin 14:219-223.
- Olsen, G. H., R. G. Linscombe, V. L. Wright, and R. A. Holmes. 1988.

  Reducing injuries to terrestrial furbearers by using padded foothold traps.

  Wildlife Society Bulletin 16:303-307.
- Onderka, D. K. 1999. Pathological examinations as an aid for trap selection guidelines: usefulness and limitations. Pages 47-52 in G. Proulx, editor, Mammal trapping, Alpha Wildlife Research & Management Ltd., Sherwood Park, Alberta.
- Onderka, D. K., D. L. Skinner, and A. W. Todd. 1990. Injuries to coyotes and other species caused by four models of footholding devices. Wildlife Society Bulletin 16:303-307.
- Palmisano, A. W. and H. H. Dupuie. 1974. Unpublished manuscript. An evaluation of steel traps for taking fur animals in coastal Louisiana. Louisiana Cooperative Wildlife Unit. Louisiana State University. Baton rouge, Louisiana. 12 pp.
- Pawlina, I. M. and G. Proulx. 1999. Factors affecting trap efficiency: a review. Pages 95-115 in G. Proulx, editor. Mammal trapping. Alpha Wildlife Research & Management Ltd., Sherwood Park, Alberta.
- Phillips, R. L, F. S. Blom, G. J. Dasch, and J. W. Guthrie. 1992. Field evaluation of three types of coyote traps. Proceedings of the Vertebrate Pest Conference 15:393-395.

- Phillips, R. L. 1996. Evaluation of 3 types of snares for capturing coyotes. Wildlife Society Bulletin 24:107-110.
- Phillips, R. L. and K. S. Gruver. 1996. Performance of the Paws-I-Trip<sup>™</sup> pan tension device on 3 types of traps. Wildlife Society Bulletin 24:119-122.
- Phillips, R. L. and C. Mullis. 1996. Expanded field testing of the No. 3 Victor Soft Catch® trap. Wildlife Society Bulletin 24:128-131.
- Phillips, R. L., K. S. Gruver, and E. S. Williams. 1996. Leg injuries to coyotes captured in three types of foothold traps. Wildlife Society Bulletin 24:260-263.
- Proulx G. 1999a. Review of current mammal trap technology in North America.

  Pages 1-46 in G. Proulx, editor. Mammal trapping, Alpha Wildlife Research & Management Ltd., Sherwood Park, Alberta.
- Proulx G. 1999b. The Bionic: An effective marten trap. pp. 79-87 in G.
  Proulx, editor. Mammal trapping. Alpha Wildlife Research & Management Ltd.,
  Sherwood Park, Alberta.
- Proulx, G. and M. W. Barrett 1989. On the development and implications of the Conibear 120 Magnum trap to harvest marten and mink. Pages 194-209 in R. Lafond (ed). Proceedings Northeast Fur Resources Technical Committee. Beauport, Quebec, Canada.
- Proulx, G. and M. W. Barrett. 1990. Assessment of power snares to effectively kill red fox. Wildlife Society Bulletin 18:27-30.
- Proulx, G. and M. W. Barrett. 1991a. Ideological conflict between animal rightists and wildlife professionals over trapping wild furbearers.
- Transactions North American Wildlife and Natural Resources Conference 56:387-399.
- Proulx, G. and M. W. Barrett. 1991b. Evaluation of the Bionic trap to quickly kill mink (Mustela vison) in simulated natural environments. Journal of Wildlife Diseases 27:276-280.
- Proulx, G. and M. W. Barrett. 1993a. Evaluation of the Bionic® trap to quickly kill fisher (Martes pennanti) in simulated natural environments. Journal of Wildlife Diseases 29:310-316.
- Proulx, G. And M. W. Barrett. 1993b. Evaluation of mechanically improved Conibear 220<sup>TM</sup> traps to quickly kill fisher (Martes pennanti) in simulated natural environments. Journal of Wildlife Diseases 29:317-323.
- Proulx, G. and M. W. Barrett. 1993c. Field testing the C120 Magnum for mink. Wildlife Society Bulletin 21:421-426.
- Proulx, G., M. W. Barrett, and S. R. Cook. 1989a. The C120 Magnum: an effective quick-kill trap for marten. Wildlife Society Bulletin 17:294-298.
- Proulx, G., W. Barrett, and S. R. Cook. 1990. The C120 Magnum with pan trigger: A humane trap for mink (Mustela vison). Journal of Wildlife Diseases 26:511-517.
- Proulx, G., S. R. Cook, and M. W. Barrett. 1989b. Assessment and preliminary development of the rotating-jaw Conibear 120 trap to effectively kill marten (Martes americana). Canadian Journal of Zoology 67:1074-1079.
- Proulx, G. and R. K. Drescher. 1994. Assessment of rotating-jaw traps to humanely kill raccoons (Procyon lotor). Journal of Wildlife Diseases 30:335-339.
- Proulx, G. M., A. Kolenosky, M. J. Badry, P. J. Cole, and R. K. Drescher. 1993a. Assessment of the Sauvageau 2001-8 trap to effectively kill arctic fox. Wildlife Society Bulletin 21:132-135.

2477

- Proulx, G., A. J. Kolenosky, M. J. Badry, P. J. Cole, and R. K. Drescher. 1994a. Snowshoe hare snare system to minimize capture of marten. Wildlife Society Bulletin 22:639-643.
- Proulx, G. M., A. J. Kolensosky, and P. J. Cole. 1993b. Assessment of the Kania® trap to humanely kill red squirrels (Tamiasciurus hudsonicus) in enclosures. Journal of Wildlife Diseases 29:324-329.
- Proulx, G., A. J. Kolenosky, P. J. Cole, and R. K. Drescher. 1995. A humane killing trap for lynx (Felis lynx): the Conibear 330<sup>™</sup> with clamping bars. Journal of Wildlife Diseases 31:57-61.
- Proulx, G., D. K. Onderka, A. J. Kolenosky, P. J. Cole, R. K. Drescher, and M. I. Badry. 1993c. Injuries and behavior of raccoons (Procyon lotor).
- M. J. Badry. 1993c. Injuries and behavior of raccoons (Procyon lotor) captured in the Soft Catch™ and the Egg™ traps in simulated natural environments. Journal of Wildlife Diseases 29:447-452.
- Proulx, G., I. M. Pawlina, D. K. Onderka, M. J. Badry, and K. Seidel. 1994b. Field evaluation of the number 1½ steel-jawed leghold and the
- Sauvageau 2001-9 traps to humanely capture arctic fox. Wildlife Society Bulletin 22:179-183.
- Redig, P. 1981. Significance of trap-induced injuries to bald eagles. Pages
   45-53 in Eagle Valley Environmental Technical Report BED 81. University of Minnesota. St. Paul.
- Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, J.R. Squires. 1999. The scientific basis for lynx conservation: qualified insights. In Ruggiero, L.F., K.B Aubry, S.W. Buskirk, et al., tech. eds. The scientific basis for lynx conservation in the contiguous United States. Gen. Tech. Rpt. RMRS-GTR-30. Ogden, UT: U.S. Dept. Agriculture, Forest Service, Rocky Mountain Research Station.
- Sahr, D. P., and F. F. Knowlton. 2000. Evaluation of tranquilizer trap devices (TTDs) for foothold traps used to capture gray wolves. Wildlife Society Bulletin 28:597-605.
- Saunders, B. P. and H. C. Roswell. 1984. Padded trap testing in British Columbia. Proceedings Western Conference of the International Association Fish and Wildlife Agencies 64:136-142.
- Seddon, P. J., Y. V. Heezik, and R. F. Maloney. 1999. Short- and mediumterm evaluation of foot hold trap injuries in two species of fox in Saudi Arabia. Pages 67-77 in G. Proulx, editor. Mammal trapping. Alpha Wildlife Research & Management Ltd., Sherwood Park, Alberta.
- Serfass, T. L., R. P. Brooks, T. J. Swimley, L. M. Rymon, and A. H. Hayden. 1996. Considerations for capturing, handling, and translocating river otters. Wildlife Society Bulletin 24:25-31.
- Shivik, J. A., K. S. Gruver, and T. J. DeLiberto. 2000. Preliminary evaluation of new cable restrains for capturing coyotes. Wildlife Society Bulletin 28:606-613.
- Siemer, W. F., G. R. Batcheller, R. J. Glass, and T. L. Brown. 1994. Characteristics of trappers and trapping participation in New York. Wildlife Society Bulletin 22:100-111.
- Skinner, D. L. and A. W. Todd. 1992. Evaluating efficiency of footholding devices for coyote capture. Wildlife Society Bulletin 18:166-175.
- Stocek, R. F and D. J. Cartwright. 1985. Birds as non-target catches in the New Brunswick furbearer harvest. Wildlife Society Bulletin 13:314-317.
- Sweitzer, R. A., B. J. Gonzales, I. A. Gardner, D. Van Vuren, J. D.

2477

- Waithman, and W. M. Boyce. 1997. A modified panel trap and immobilization technique for capturing multiple wild pig. Wildlife Society Bulletin 25:699-705.
- Tullar, B. F. 1984. Evaluation of a padded leg-hold trap for capturing foxes and raccoons. NY Fish and Game Journal 31:97-103.
- Turkowski, F. J., A. R. Armistead, and S. B. Linhart. 1984. Selectivity and effectiveness of pan tension devices for coyote foothold traps. Journal of Wildlife Management 48:700-708.

  United States of America / European Community. 1997. Agreed minute and annex: Standards for the humane trapping of specified terrestrial and semi-aquatic mammals. Brussels.
- Van Ballenberghe, V. 1984. Injuries to wolves sustained during live-capture. Journal of Wildlife Management 48:1425-1429.
- Waller, D. J. 1981. Effectiveness of kill-type traps versus leg-hold traps utilizing dirt-hole sets. Proceedings of the Annual Conference of the Southeastern Association Fish & Wildlife Agencies 35:256-260.
- White, P. J., T. J. Kreeger, U. S. Seal, and J. R. Tester. 1991.

  Pathological responses of red foxes to capture in box traps. Journal of Wildlife Management 55:75-80.